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# PRE-Mix

*(Compilations of the Multiple Choice Questions)*

*For*

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# Environment

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## Renewable Energy

1. Consider the following statements in the context of biomass as a source of energy:

1. Biomass is better than fossil fuel in terms of the impact of fuel burning on the Carbon Budget of the environment.
2. Incineration is the process of burning biomass in the presence of air at high temperatures.
3. Gasification is a process using micro-organisms in an anaerobic environment to produce methane gas from biomass.

Which of the above-mentioned statements is/are correct?

- A. Only 1
- B. 1 and 2 only
- C. 2 and 3 only
- D. Only 2

**Answer: B**

### Explanation

- Biomass gasification is a mature controlled process involving heat, steam, and oxygen to convert biomass to hydrogen and other products, without combustion.
- Whereas it is the process of Bio methanation in which organic material is microbiologically converted under anaerobic conditions into biogas.

- How is biomass better than fossil fuel in terms of the impact of fuel burning on the Carbon Budget of the environment?

✓ Fossil fuels release carbon dioxide into the atmosphere which is stored in the earth for millions of years. Using fossil fuel releases the stored carbon within Earth's crust. Which adds to the carbon budget of the environment.

- The burning of biomass releases the same amount of Carbon Dioxide (CO<sub>2</sub>), however the release of CO<sub>2</sub> is balanced by the CO<sub>2</sub> absorbed during the process of photosynthesis during the growth of the biomass.

- The processes through which biomass can be converted into usable energy:

✓ Combustion/incineration- It is the simplest form of using biomass as fuel by burning it in the presence of air.

✓ Bio-Methanation or Anaerobic Digestion- It is a process by which organic material is microbiologically converted under anaerobic conditions to biogas.

✓ Gasification/Pyrolysis- It is a process of chemical decomposition of organic matter using heat in the absence of air/oxygen.

2. The Pradhan Mantri Kisan Urja Suraksha Evem Utthan Mahabhiyan (PM KUSUM) Scheme for farmers for installation of solar pumps and grid-connected solar and other renewable power plants in the country. Which of the following statements is/are correct in the context of PM KUSUM?

1. The Scheme is an initiative of the Ministry of New and Renewable Energy.
2. Under Component A, individual plant size up to 5 MW is allowed.
3. The scheme will allow farmers to sell excess solar power which can be supplied to the grid.

Select the correct option from the codes given below:

- A. Only 1
- B. 1 and 2 only
- C. 1, 2 and 3
- D. 1 and 3 only

**Answer: D**

**Explanation**

- Individual farmers/groups of farmers/cooperatives/ panchayats/ Farmer Producer Organisations (FPO) are eligible to set up Renewable power projects of capacity 500 kW to 2 MW.
- Ministry of New and Renewable Energy (MNRE) has launched the Pradhan Mantri Kisan Urja Suraksha evem Utthan Mahabhiyan (PM KUSUM) Scheme for farmers for installation of solar pumps and grid-connected solar and other renewable power plants in the country.

- The scheme aims to add solar and other renewable capacities of 25,750 MW by 2022 with the total central financial support of Rs. 34,422 Crore including service charges to the implementing agencies.
- The Scheme consists of three components:
  - ✓ Component A: 10,000 MW of Decentralized Ground Mounted Grid Connected Renewable Power Plants of individual plant size up to 2 MW.
  - ✓ Component B: Installation of 17.50 lakh standalone Solar Powered Agriculture Pumps of individual pump capacity up to 7.5 HP.
  - ✓ Component C: Solarisation of 10 Lakh Grid-connected Agriculture Pumps of individual pump capacity up to 7.5 HP.
- Scheme implementation- State Nodal Agencies (SNAs) of MNRE will coordinate with States/UTs, Discoms and farmers for implementation of the scheme.
- Benefits of PM KUSUM:
  - ✓ The scheme will open a stable and continuous source of income to the rural landowners for a period of 25 years by utilization of their dry/uncultivable land.
  - ✓ Further, in case cultivated fields are chosen for setting up solar power projects, the farmers could continue to grow crops as the solar panels are to be set up above a minimum height.

- As these power plants will be located closer to the agriculture loads or electrical substations in a decentralized manner, it will result in reduced Transmission losses for STUs and Discoms.
- The solar pumps will save the expenditure incurred on diesel for running diesel pumps and provide the farmers a reliable source of irrigation through solar pumps apart from preventing harmful pollution from running diesel pumps.

3. Which of the following statements is correct in the context of Geo-Thermal Energy?

1. Geothermal Energy is the heat available in the crust of the earth, which is used for power generation.
2. Currently, there is no Geo-Thermal Power plant operational in India.

Select the correct code from the codes given below:

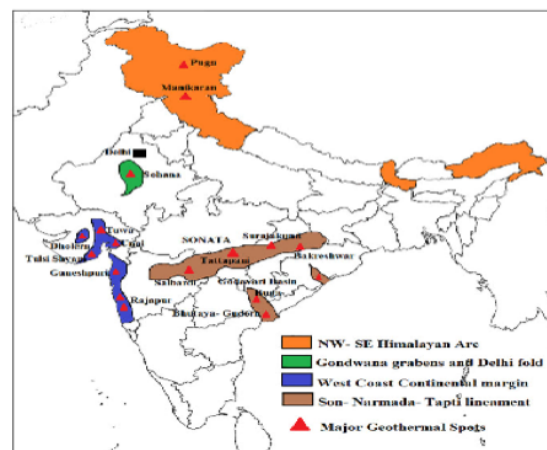
- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Neither 1 nor 2

**Answer: C**

**Explanation**

- Geothermal energy is heat within the earth. Geothermal energy is a renewable energy source because heat is continuously produced inside the earth.

- Oil and Natural Gas Corporation (ONGC) will carry out the first Geothermal Field Development Project in India which will be implemented in Ladakh.
- Geothermal power is considered to be renewable because any projected heat extraction is small compared to the Earth's heat content.
- Geothermal power is also considered to be sustainable thanks to its power to sustain the Earth's intricate ecosystems.
- By using geothermal sources of energy present generations of humans will not endanger the capability of future generations to use their own resources to the same amount that those energy sources are presently used.
- Further, due to its low emissions geothermal energy is considered to have excellent potential for mitigation of global warming.
- Currently there is no Geo-Thermal Plant operational in India the first proposed plant will be set up in Ladakh.



4. Which of the following statements is correct in the context of Hydrogen Fuel?

1. It can be used in fuel cells, internal combustion engines, and as a fuel for spacecraft propulsion.
2. Blue Hydrogen is extracted from the Deep oceans.
3. The Union Government has launched a National Hydrogen Mission for generating hydrogen from green power sources.

Select the correct option from the codes given below:

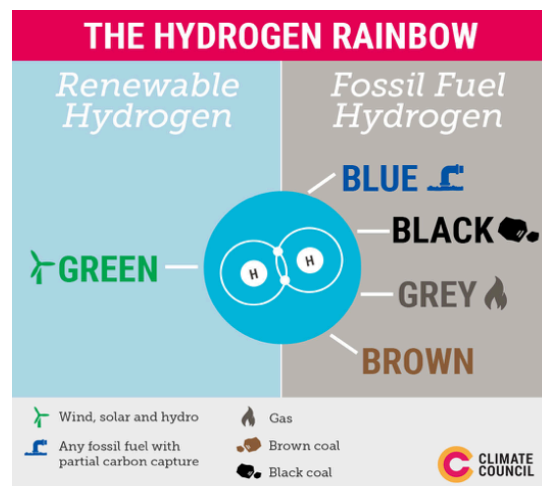
- A. Only 3
- B. 1 and 3 only
- C. 1, 2 and 3
- D. None of the above

**Answer: B**

**Explanation**

- Blue hydrogen is produced using the same reforming process that is used to create grey, brown and black hydrogen, but the CO<sub>2</sub> that would ordinarily be released is captured and stored underground.
- Hydrogen as a fuel:
  - ✓ Hydrogen is a clean fuel that, when consumed in a fuel cell, produces only water.
  - ✓ Hydrogen can be produced from a variety of domestic resources, such as natural gas, nuclear power, biomass, and renewable power like solar and wind.

- ✓ These qualities make it an attractive fuel option for transportation and electricity generation applications.
- ✓ It can be used in cars, in houses, for portable power, and in many more applications.



- National Hydrogen Mission:
  - ✓ National Hydrogen Energy Mission aims to promote the generation of hydrogen from green power sources.
  - ✓ The Mission would put forward specific strategy for the short term (4 years), and broad strokes principles for the long term (10 years and beyond).
  - ✓ The aim is to develop India into a global hub for the manufacturing of hydrogen and fuel cells technologies across the value chain.
  - ✓ Major activities envisaged under the Mission include creating volumes and infrastructure; demonstrations in niche applications (including for transport, industry); goal-oriented Research & Development; facilitative policy support; and putting in place a robust framework for standards and regulations for hydrogen technologies.

5. The Ministry of Petroleum and Natural gas has notified the targets for Ethanol Blending under National Policy on Biofuels 2018. Consider the following statements in the context of Ethanol blending targets.

1. E10 is the target to achieve an Ethanol mix of 10% with 90% diesel by 2022.
2. E20 is the target to achieve an Ethanol mix of 20% with 80% Petrol by 2030.
3. Currently, India has achieved 10% Ethanol blending in petrol.

Which of the statements mentioned above is/are correct?

- A. 1, 2 and 3
- B. 1 and 2
- C. Only 1
- D. None of the above.

Answer: C

Explanation

**Ethanol blending?**

- Ethanol is a biofuel, which is produced by processing organic matter. Ethanol is high in oxygen content, which therefore allows an engine to more thoroughly combust fuel.
- It can be mixed with fuel in different quantities and can help reduce vehicular emissions. Also, since it is plant-based, it is considered to be a renewable fuel.

**Ethanol blending in India:**

- Currently, India has achieved 8% (2021) ethanol blending (improved from 1.53% in 2014)
- Recently the GoI has preponed the target to achieve the target of 20% ethanol blending with petroleum and 5% blending of bi diesel with a diesel under The National Policy on Biofuels-2018.
- The earlier target was to achieve 20% blending by 2030 which is now 2025. E10 is the target to achieve the 10% ethanol blending by 2022.
- E20 is the target to achieve 20% blending by 2025.
- E100 is a pilot project launched in Pune. The ambitious project aims to set up a network for the production and distribution of ethanol across the nation.

**Other Initiative to promote biofuel:**

- GOBAR (Galvanizing Organic Bio-Agro Resources) DHAN Scheme, 2018: The scheme aims to positively impact village cleanliness and generate wealth and energy from cattle and organic waste.
- Pradhan Mantri JI-VAN Yojana, 2019: The scheme aims to create an ecosystem for setting up commercial projects and boost Research and Development in the 2G Ethanol sector.
- Repurpose Used Cooking Oil (RUCO): The Food Safety and Standards Authority of India (FSSAI) has launched this initiative that will enable the collection and conversion of used cooking oil to biodiesel.